APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,325	02/09/2001	Nicholas P. Wilt	3382-56903	6694

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EXAMINER
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ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/780,325	WILT ET AL.
	Examiner	Art Unit	
	Chante Harrison	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _22 December 2003_.
2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-18_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) _1,2,5,6,8-10 and 18_ is/are rejected.
7)☒ Claim(s) _3,4,7 and 11-17_ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to the following communication: Amendment A filed on

12/22/03.

2.   Claims 1-18 are pending in this application. Claims 1 and 6 are independent

claims.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by S.

Paul Tucker et al., U.S. Patent 5,926,406, 7/1999.

As per independent claim 1, Tucker discloses performing a plurality of the

computationally less expensive floating point operations on an item of the sensory data

(col. 11,ll. 33-41); combining results of the plural performed operations to yield an

approximation of a result of the power function on the sensory data item (i.e. computing

the accessed look up table values to approximate the floating point exponent) (col. 11,

ll. 30-43); and evaluating the expression using the approximation to provide a

converted sensory data item(i.e. the computation of the obtained values is

implemented in the lighting machine, which outputs a final color value, hence, a

converted sensory data item) (abstract; Fig. 4 "176"; col. 5, ll. 20-30; col. 11, ll. 42-43).

As per dependent claim 5, Tucker discloses executing a single instruction,

multiple data floating point operation instruction to perform a first of the computationally

less expensive floating point operations on multiple items of the sensory data together

(col. 5, ll. 28-31; col. 6, ll. 40-45; col. 9, ll. 26-33; col. 14, ll. 37-45, 55-60).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claim 2 is rejected under 35 U.S.C. 103(a) as being obvious over Tucker and

further in view of Ravi Shankar et al., U.S. Patent 6,351,760, 2/2002.

As per dependent claim 2, Shankar discloses floating point operations taken from

a group comprising addition, subtraction, multiplication, square root and reciprocal

operations (col. 12, ll. 42-64), which Tucker fails to disclose. It would have been obvious to one of skill in the art to incorporate Shankar's varied floating operations with the disclosure of Tucker because Tucker teaches using differing floating point operations to improve the calculation of exponential values (col. 7, ll. 50-60; col. 11, ll. 25-45).

5.   Claims 6, 8-10 and 18 are rejected under 35 U.S.C. 103(a) as being obvious over Ikko Fushiki et al., U.S. Patent 6,462,748, 10/2002 and further in view of. Tucker et al., U.S. Patent 5,926,406, 7/1999.

The applied reference (Fushiki) has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29,

1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

As per independent claim 6, Fushiki discloses a display monitor (Fig. 1 "47") a display unit operative to display an image on the display monitor, where the image is represented by perceptual image data comprising a plurality of color pixel data specifying colors in a perceptual color space, the perceptual color space having a non-unity gamma (col. 7, ll. 29-32); a physical image processor operative to perform an image processing operation on physical image data in which color pixel data specifies colors in a physical color space (col. 6, ll. 15-25), the physical color space having a unity gamma within a range (col. 7, ll. 25-31), and a perceptual/physical image converter operating to convert the perceptual image data to the physical image data according to a perceptual-to-physical conversion expression so as to permit the physical image processor to perform the image processing operation prior to display (col. 6, ll. 37-60), and to convert the physical image data back to the perceptual image data according to a physical-to-perceptual conversion expression (col. 6, ll. 37-60). Tucker discloses a color conversion expression involving a power function (i.e. x) and a reverse color conversion expression involving an inverse power function (i.e. log2(a)) after the image processing operation for display on the display monitor (col. 14, ll. 55-60; abstract; Fig. 3), the color image converter approximating the power function and

the inverse power function as a weighted mathematical combination of plural

computationally inexpensive floating point operations on items of the image data (col.

7, II. 50-67; col. 11, II. 42-43), which Fushiki fails to disclose. It would have been

obvious to one of skill in the art to include Tucker's expressions involving a power

function and an inverse power function when converting to and from a color space,

where the functions are approximated as a combination of plural floating point

operations with the disclosure of Fushiki because Fushiki teaches specifying color data

in both perceptual and physical color spaces and converting the data between the color

spaces by taking into consideration the gamma adjustments needed to display the

image data in either specified color space (col. 5-6).

As per dependent claim 8, Tucker discloses approximating the power function as

a weighted mean of floating point operations (col. 7, II. 50-67; col. 11, II. 42-43), which

Fushiki fails to disclose. Fushiki discloses floating point operations taken from a group

comprising addition, subtraction, multiplication, square root and reciprocal operations

(col. 3, II. 20-25, 38-49). It would have been obvious to one of skill in the art to include

Tucker's teaching that functions are approximated as a combination of plural floating

point operations with the disclosure of Fushiki because Fushiki teaches specifying

color data in both perceptual and physical color spaces and converting the data

between the color spaces by taking into consideration the gamma adjustments needed

to display the image data in either specified color space (col. 5-6).

As per dependent claim 9, Tucker discloses approximating the power function as a weighted sum of floating point operations (col. 7, ll. 50-67), which Fushiki fails to disclose. Fushiki discloses floating point operations taken from a group comprising addition, subtraction, multiplication, square root and reciprocal operations (col. 3, ll. 20-25, 38-49). It would have been obvious to one of skill in the art to include Tucker's teaching that functions are approximated as a combination of plural floating point operations with the disclosure of Fushiki because Fushiki teaches specifying color data in both perceptual and physical color spaces and converting the data between the color spaces by taking into consideration the gamma adjustments needed to display the image data in either specified color space (col. 5-6).

As per dependent claim 10, Fushiki in view Tucker discloses the computationally inexpensive floating point operations comprise at least some of addition, subtraction, multiplication, square root and reciprocal operations (col. 3, ll. 20-25, 38-49).

As per dependent claim 18, Fushiki in view Tucker discloses a computer processor having in instruction set including at least one single instruction, multiple data floating point operation instruction (col. 5, ll. 28-31; col. 6, ll. 40-45; col. 9, ll. 26-33; col. 14, ll. 37-45, 55-60); wherein the perceptual/physical image converter approximates the power function (i.e. x) and the inverse power function (i.e. log2(a)) (col. 14, ll. 55-60; abstract) by evaluating an expression combining exponential functions composed of at least one of square, square root and reciprocal operations

performed using the at least one single instruction, multiple data floating point

operation instruction (col. 17, ll. 1-5).

Claims 3-4, 7 and 11-17 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

Response to Arguments

4.   Applicant's arguments filed 12/22/03 have been fully considered but they are not

persuasive.

With respect to claims 1 and 5, Applicant argues that Tucker fails to discloses the

elements of claim 1 because he teaches looking up a corresponding value in a look-up

table, which does not suggest performing a plurality of floating point operations and

combining results of the plural operations to yield an approximation of a result of the

power function on the sensory data item.

In response, Tucker inherently teaches processing floating-point operations as

he teaches providing a look up table having predefined approximations based upon a

floating-point representation (col. 4, ll. 1-5), where the predefined approximation is

applied for both the integer and fractional floating point components. Thus the

predefined approximations are inherently determined by floating point operations that

yield a floating representation. Therefore, Tucker inherently teaches performing a

plurality of floating point operations. Tucker additionally discloses combining the

computed integer and fractional predefined approximations to determine the final value

of the approximation of the exponential expression of the lighting (i.e. sensory data

item) (col. 4, ll. 7-11). Therefore, Tucker also suggests combining results of the plural

operations to yield an approximation of a result of the power function on the sensory

data item.

Therefore the rejection in view of Tucker is maintained.

With respect to claims 6, 10 and 18, Applicant argues both Tucker and Fushiki

fail to teach approximating the power function and the inverse power function as a

weighted mathematical combination of plural computationally inexpensive floating point

operations on items of the image data.

In response, Tucker teaches approximating the power function and the inverse

power function (i.e. log2(a)) as a weighted mathematical combination of plural

computationally inexpensive floating point operations on items of the image data (col. 7,

ll. 50-67; col. 11, ll. 42-43).

Therefore the rejection in view of Fushiki and further in view of Tucker is maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chante Harrison whose telephone number is 703-305-

3937. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mike Razavi can be reached on 703-305-4713. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Chante Harrison
Examiner
Art Unit 2672

February 26, 2004

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